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Woods Hole, Massachusetts

Reference No. 50-4

PACIFIC OCEANIC BIOLOGY
(Oceanographic Research)

C. J. Fish, SUPERVISOR

July 1, 1949 - September 30, 1949

Periodic Status Report
Office of Naval Research
Contract N6-ori-195/TO 1/NR-083-003

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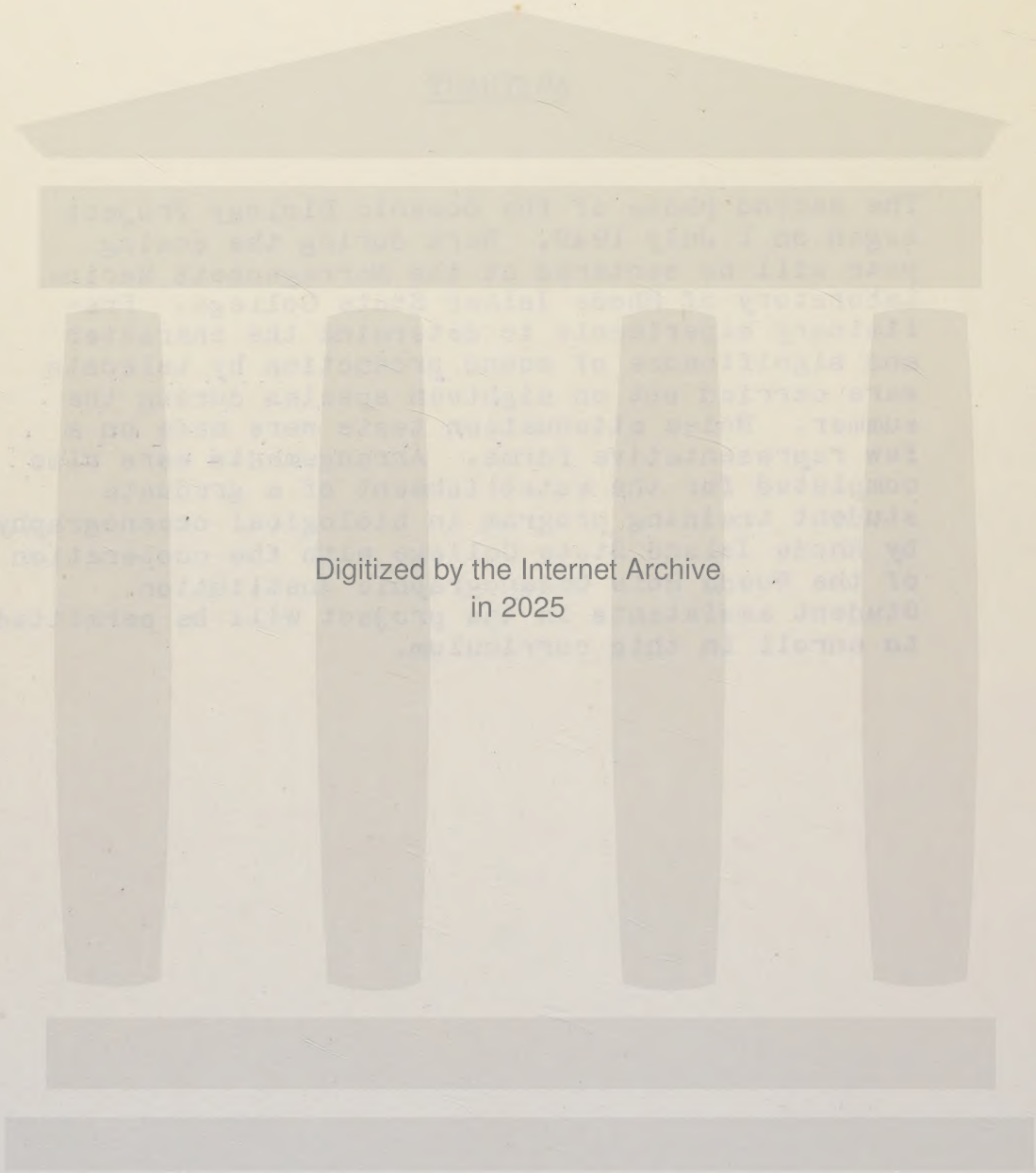
APPROVED FOR DISTRIBUTION C. D. Darling
Director

ABSTRACT

The second phase of the Oceanic Biology Project began on 1 July 1949. Work during the coming year will be centered at the Narragansett Marine Laboratory of Rhode Island State College. Preliminary experiments to determine the character and significance of sound production by teleosts were carried out on eighteen species during the summer. Noise attenuation tests were made on a few representative forms. Arrangements were also completed for the establishment of a graduate student training program in biological oceanography by Rhode Island State College with the cooperation of the Woods Hole Oceanographic Institution. Student assistants in the project will be permitted to enroll in this curriculum.



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Subj: Oceanic Biology Project

1. As originally planned, the second phase of the Oceanic Biology Project would consist of a comprehensive basic biological oceanography field program, closely correlated with those of the Hydrographic Office in physical oceanography and the Fish and Wildlife Service in high seas fishery research. Biological oceanography forms an essential intermediate field of investigation distinct both in scope and personnel requirements from physical oceanography and fishery research. However, it is now evident that before any major expansion in this subject can take place, new personnel must be trained.

2. Except for work on the classified index of oceanographic publications which will be continued at Woods Hole by the Secretary-Technician, all project activities during the coming year will be carried out at the Narragansett Marine Laboratory of Rhode Island State College where the academic needs of the student assistants can be met, and conditions are more favorable for sonic animal experimentation.

OBJECTIVES

3. The present project provides for basic research in two of the subjects originally specified by the Navy for investigation and subsequently reviewed in the Pacific Oceanic Biology Project. Allowance also is made for the training of a limited number of carefully selected graduate student assistants. The classified index of Pacific oceanographic publications is being maintained up to date and will be expanded to include the Atlantic and Arctic.

4. Research. The research program has been so designed that although carried on in the Atlantic the results will be equally applicable in the solution of Pacific problems.

a) Biology of vertebrate and invertebrate sonic marine animals, with particular reference to the character and significance of the sounds produced by different species, controlling factors and seasonal variation. Previous study

has revealed many potential producers of underwater sound and how their characteristic noises are created, but not when and where the sounds may be expected. Thus one of the objectives of the summer program undertaken at the Narragansett Marine Laboratory by Marie P. Fish, Alton S. Kelsey, Jr. and John H. Kelly, Jr. has been to determine the underlying causes for sound-making, and the composition of the sounds so produced.

5. Delays in the delivery of apparatus prevented the start of field activities until 22 July, but thereafter until 31 August hydrophones and sound-recording gear were in constant operation. Portable equipment was used for observations made in commercial fish traps, hydrophones anchored in bay enclosures made possible continuous Esterline-Angus chartings, and a Presto 6-N Recording Turntable and Audiograph produced over 60 disc recordings. Eighteen species were subjected to a routine set of conditions to determine what stimuli induced sound production. Using a few species in which sound could be produced at will, a series of noise attenuation tests were made at measured distances parallel to the shoreline. Experiments in tanks having proven rather unsatisfactory, most of the specimens were tested in wire enclosures located below the low tide line. Available equipment has so far made possible only a rather general determination of frequency and intensity levels and of periodicity patterns. In future work the requirement for more accurate means of studying the composition of the sounds will be met with a G. E. Oscillograph to be loaned by the Naval Ordnance Laboratory. If this instrument does not arrive before the present season's field activities terminate in September it will be used to analyze disc recordings during the winter in a laboratory assigned for the purpose at Brown University, and later returned when experimental work is resumed at the Narragansett Laboratory with the arrival of sonic species in the spring.

6. b) Biology of a fouling population during its pre-attachment period. Institution of work on this problem has been delayed pending a decision on a proposed plankton program for weatherships in the North Atlantic. If approved, research on the biology of the zooplankton population of the open ocean will be substituted in place of the fouling studies. Otherwise the fouling studies will be made as planned, by C. J. Fish and student assistants.

7. Training. To assist in overcoming the present serious dearth of qualified biological oceanographers and fishery biologists, which has been unavoidable and must remain so until the few universities possessing vessel and marine station facilities secure balanced staffs of qualified instructors, arrangements have been made for the establishment of a graduate student training program in biological oceanography by Rhode Island State College with the cooperation of the Woods Hole Oceanographic Institution. Instruction and supervision of research will be provided by members of the staffs of the two institutions. Accomplishments to date include:

a) Appointment of the project supervisor as Director of the Narragansett Laboratory and Professor of Marine Biology in charge of graduate work in biological oceanography at Rhode Island State College.

b) Adoption by the College of new basic undergraduate and graduate curricula for students planning to major in marine biology.

c) Reactivation of the Narragansett Marine Laboratory and the chartering of a vessel for year-round operation as an independant unit of the College of Arts and Science.

d) Contribution of the services of nine members of the Woods Hole Oceanographic Institution and two members of the U. S. Fish and Wildlife Service research staff to supplement the College faculty for class instruction at Kingston, and cooperation in the supervision of graduate research.

8. A carefully selected group of graduate student assistants will enroll in September as candidates for the degree of Master of Science in Marine Biology. The first college year will be spent in Kingston and at the Narragansett Marine Laboratory where training in vessel work will be given during the summer months. Having completed college residence requirements in the first year it is expected that most if not all of the students will spend the second year completing their theses in Woods Hole. Those qualified for basic oceanographic research will participate in the plankton program and occupy quarters provided for them in the Woods Hole Oceanographic Institution. Those preparing for a career in applied fisheries biology may be assigned to the U. S. Fish and Wildlife station where they will benefit from close association with the local fisheries research staff. In this way the potential biological oceanographers should receive sufficiently advanced instruction in all pertinent branches of oceanography, and at the same time obtain academic credit and essential field and vessel experience.

PERSONNEL

9.

Name	Title	Total Man Days*
Charles J. Fish	Senior Biologist, in charge (quarter time)	16
Marie P. Fish	Assistant Biologist	64
Mary C. Cobb	Secretary-Technician	64
Alton S. Kelsey, Jr.	Student-assistant	54
John H. Kelly, Jr.	Temporary assistant	52
		250 Man Days

*Man day consists of 8 working hours.